

deeply and obliquely cleft or subvertical mouth, whose upper margin is constituted by the supra-maxillaries as well as inter-maxillaries, branchiostegal arch near and parallel with lower jaw, scapular arch with an inferior projection, and with one or more of the neural spines abnormally developed and projecting above the back in advance of the dorsal fin.

The two genera of the family are so distinct that their relations in a general system may be expressed with apparent propriety under special subfamily names.

STERNOPTYCHINÆ.

Sternoptychids with the abdominal outline nearly continuous in a sigmoid curve, a single produced spike-like neural spine in front of the dorsal fin, and about five branchiostegal rays.

The skeleton of *Sternoptyx diaphanus* is represented on plate II, fig. 7.

ARGYROPELECINÆ.

Sternoptychids with the abdominal outline abruptly contracted in advance of the anal fin, several produced neural spines constituting a serriform ridge in advance of the dorsal fin, and about nine branchiostegal rays.

THE OSTEOLOGICAL CHARACTERISTICS OF THE LUTJANINÆ.

By THEODORE GILL.

The subfamily Lutjaninæ contains a number of fishes, representing in the American waters seven genera, which manifest considerable diversity in structural characteristics, but which nevertheless have many features in common. The group appears, on the whole, to be homogeneous, although it may be advisable hereafter to dis sever its constituents into two subfamilies. All are, however, distinguished from the typical Sparidæ by the absence of distinct tubercles from the cranium for articulation with the epipharyngeal bones, the development of enlarged apophyses for articulation with the palatine and preorbital bones, and the atrophy of parapophyses of the anterior vertebræ. The parapophyses may be said to be absolutely wanting to the anterior four vertebræ and but faintly developed on the fifth and sixth, or even seventh, while the ribs are inserted in sockets or pits in the bodies of all six, creeping higher and higher upwards as they approach the cranium, and fitting into pits at the bases of the neurapophyses of the second and first (and, it may be, the third) vertebræ. Such are the characters common even to the extremes, and the differences between them are slight and only of degree. Further, all the genera have the form and articulations of the maxillary bones characteristic of the Pristipomids, Serranids and related types, and unlike those of the Sparids.

The genera of this group were long ago recognized by me, and the osteology abundantly confirms their validity. Professor Jordan has, however, been unable to recognize generic characters for the exterior, and I have therefore been impelled to a task too long delayed, and herewith submit the cranial characteristics of the various genera. I am indebted to my venerable friend, Professor Poey, for the skeletons which have enabled me to formulate the characters. They represent almost all of the species found in the Cuban waters. Professor Poey long ago appreciated the importance of osteology for the full knowledge of the relationships of fishes, and published, in 1871,* a synopsis of the Lutjaninæ, in which he adopted the genera here characterized.

As Professor Jordan will soon publish a revision of the American species of Lutjaninæ and give the external characteristics of the genera, this article is limited to the exhibition of the skeletal features, and only such of them as appear to be most salient, and therefore best fitted for diagnosis.

Professor Jordan has recognized the characteristics of the pterygoid armature and number of gill-rakers in the case of the several genera.

It may be that a distinct family should be constituted for the Lutjaninæ and Hoplopagrinae (to be called Lutjanidæ), with the characters above indicated as their most essential features. I have not been able, however, to examine the osteology of the remarkable and eccentric *Hoplopagrus Guentheri*.†

LUTJANINÆ.

Synonyms as subfamily names.

- <Mesopriontiformes,‡ *Bleeker*, Enum. Sp. Piscium in Archipel. Indico, p. xix, 1859.
(Composed chiefly of Sparidæ; not defined.)
- =Lutjaninæ, *Gill*, Proc. Acad. Nat. Sc. Phila., 186, 2p. 446, 1862 (defined).
- >Lutjanini, *Poey*, Repertorio Fisico-Natural de Cuba, t. 2, p. 205, 1868 (not defined).
- >Platyniini, *Poey*, Repertorio Fisico-Natural de Cuba, t. 2, p. 205, 1868 (not defined.)
- =Lutjanini, *Poey*, Annals Lyceum Nat. Hist. N. Y., v. 10, p. 58, 1871 (described).
- <Spariformes‡ (Lutjanini §) *Bleeker*, Archives Néerlandaises Sc. Exactes et Nat., t. 11, p. 270 (275); Systema Percarum, i, p. 24 (29) 1876; Atlas Ich. des Indes Néerlandaises, t. 8? 1876?
- =Lutjaninæ, *Jordan & Gilbert*, Syn. Fishes N. Am., p. 546, 1882.
- =Lutjaninæ, *Gill*, Proc. U. S. Nat. Mus., v. 7, p. —, 1884 (cranial characteristics defined).
- Percinæ gen., *Bonaparte et al.*
- Serraninæ gen., *Günther et al.*

Synonym as family name.

- <Mesopriontoidei, *Bleeker*, Enum. Sp. Piscium in Archipel. Indico, p. 19, 1859.

In addition to the osteological characters enumerated (which are probably also shared by the Hoplopagrinae), the Lutjaninæ are, as a

*Genres des Poissons de la faune de Cuba appartenant à la famille Percidæ. Par Felipe Poey. <Annals Lyceum Nat. Hist. New York, vol. 10, pp. 27-79 (Lutjaninæ <pp. 58-71), 1871.

†Hoplopagrus Guentheri, *Gill*, Proc. Acad. Nat. Sci., 1861, p. 78; 1862, p. 253.

‡"Subfamilia" of Bleeker.

§"Phalanx" of Bleeker.

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subfamily, distinguished by the normal narial apertures anterior near the posterior, the acute teeth, and the development of teeth on the palatine as well as vomer.

ANALYSIS OF GENERA.

- I. Interorbital area not flat nor separated from the occipital region, with the median and lateral crests procurent on it, and with the frontal narrowed forwards.
 1. Prefrontals with the articular facets arising from diverging V-shaped ridges; basisphenoid with an anterior lobiform extension.
 - a. Fronto-occipital crest ceasing far from point of frontal; prefrontals with posterior areas impressed, long and cribriform; pterygoids edentulous; gill-rakers few..... LUTJANUS.
 - b. Fronto-occipital crest continued on ethmoid; prefrontals with posterior areas short and excavated above and in front; pterygoids dentigerous; gill-rakers numerous OCYURUS.
 2. Prefrontals with the articular facets developed from simple tubercles, and not V-shaped ridges; basisphenoid not lobigerous.
 - a. Prefrontals with the posterior areas cribriform; opisthotics with nearly simple processes; vomer with an elongated posterior dentigerous crest; pterygoids dentigerous RHOMBOPLITES.
 - b. Prefrontals with the posterior areas solid and somewhat tumid; opisthotics with bifurcate processes; vomer incurved and toothless behind its chevron; pterygoids toothless..... TROPIDIUS.
- II. Interorbital area flat, separated by a transverse line of demarcation from the occipital, by which the median as well as the lateral crests are limited; frontals wide in front.
 1. Frontals not cavernous, but simply normally perforate; postfrontals, behind, with funnel-shaped foramina; supraorbital margins crenate.
 - a. Pariotic region much swollen outwards, and with the bones thin and polished. PLATYNIUS.
 - b. Pariotic region little convex, and with the bones thick and unpolished.. ETELIS.
 2. Frontals cavernous (like those of Sciaenids) with longitudinal osseous bars leaving interspaces in front of transverse ridge, and on each side near the front; prefrontals, behind, with simple foramina for olfactory; supraorbital margins smooth..... VERILUS.

DESCRIPTIONS OF CRANIAL CHARACTERISTICS.

LUTJANUS.

PARTIAL SYNONYMY.

=Lutjanus, *Bloch*, t. 7, p. 324, 1797.

=Lutjanus, *Gill*, Proc. Acad. Nat. Sc. Phila., 1862, pp. 236-237.

=Lutjanus, *Poey*, Annals Lyceum Nat. Hist. N. Y., v. 10, p. 62, 1871.

Interorbital area not flat nor separated from the occipital region, with the median and lateral crests procurent on it, and with the frontal narrowed forwards; prefrontals with the articular joints arising from diverging V-shaped ridges with posterior areas impressed and often

cribriform; basisphenoid with anterior lobiform extension; fronto-occipital crest ceasing far from front of frontal; pterygoids edentulous; gill-rakers few.

Type *L. lutjanus*, Bloch.

OCYURUS.

PARTIAL SYNONYMY.

=Ocyurus, *Gill*, Proc. Acad. Nat. Sc. Phila., 1862, p. 236, 1862.

=Ocyurus, *Poey*, Annals Lyceum Nat. Hist. N. Y., v. 10, p. 60, 1871.

Interorbital area not flat nor separated from the occipital region, with the median and lateral crests procurrent on it, and with the frontal narrowed forwards; prefrontals with the articular facets arising from diverging V-shaped ridges with posterior areas short and excavated; basisphenoid with an anterior lobiform extension; fronto-occipital crest continued on ethmoid; pterygoids dentigerous; gill-rakers numerous.

Type *O. chrysurus* = *Sparus chrysurus*, Bloch.

RHOMBOPLITES.

PARTIAL SYNONYMY.

=Rhomboplites, *Gill*, Proc. Acad. Nat. Sc. Phila., 1862, p. 237.

=Rhomboplites, *Poey*, Annals Lyceum Nat. Hist. N. Y., v. 10, p. 61, 1871.

Interorbital area not flat nor separated from the occipital region, with the median and lateral crests procurrent on it, and with the frontal narrowed forwards, prefrontals with the articular facets developed from simple tubercles and not V-shaped ridges; with the posterior areas cribriform; opisthotics with nearly simple processes; basisphenoid not lobigerous; vomer with an elongated posterior dentigerous crest; pterygoids dentigerous.

Type *Rhomboplites aurorubens* = *Centropristes aurorubens*, Cuv. & Val.

TROPIDINIUS.

PARTIAL SYNONYMY.

=Tropidinius, *Gill*, (MSS.); *Poey*, Repertorio Fis.-Nat. de Cuba, t. 2, p. 296, 1868.

=Tropidinius, *Poey*, Annals Lyceum Nat. Hist. N. Y., v. 10, p. 65, 1871.

Interorbital area not flat nor separated from the occipital region, with the median and lateral crests procurrent on it, and with the frontals narrowed forwards; prefrontals with the articular facets developed from simple tubercles and not V-shaped ridges, with the posterior areas solid and somewhat tumid; opisthotics with bifurcate processes; basisphenoid not lobigerous; vomer incurved and toothless behind its chevron; pterygoids toothless.

Type *Tropidinius dentatus* = *Apsilus dentatus*, Guich. = *Mesoprion arnilla*, Poey.

APRION & PLATYINIUS.

PARTIAL SYNONYMY.

- = *Platyinius*, *Gill*, Proc. Acad. Nat. Sci. Phila., 1862, p. 236, 448.
- = *Platyinius*, *Poey*, Annals Lyceum Nat. Hist. N. Y., vol. x, p. 66, 1871.

Interorbital area flat, separated by a transverse line of demarcation from the occipital by which the median as well as lateral crests are limited; frontals wide in front, not cavernous but simply normally perforated; postfrontals behind with funnel-shaped foramina; supraorbital margins crenate. Periotic region much swollen outwards, and with the bones thin and polished.

Type *Aprion macrophthalmus*, = *Centropristis macrophthalmus*, Müll. & Tr. = *Mesoprion vorax*, Poey.

ETELIS.

PARTIAL SYNONYMY.

- = *Etelis*, *Cuv. & Val.*, Hist. Nat. des Poissons, t. ii, p. 127, 1828.
- = *Etelis*, *Gill*, Proc. Acad. Nat. Sci. Phila., 1862, p. 447.
- = *Etelis*, *Poey*, Annals Lyceum Nat. Hist. N. Y., vol. x, p. 67, 1871.

Interorbital area flat, separated by a transverse line of demarcation from the occipital by which the median as well as lateral crests are limited; frontals wide in front, not cavernous but simply normally perforate; postfrontals behind with funnel-shaped foramina; supraorbital margins crenate. Periotic region little convex, and with the bones thick and unpolished.

Type *E. carbunculus*, Cuv. & Val.

VERILUS.

SYNONYMY.

- Verilus*, *Poey*, Mem. Hist. Nat. de Cuba, t. 2, p. 125.
- Verilus*, *Poey*, Annals Lyceum Nat. Hist. N. Y., vol. x, p. 70, 1871.

Interorbital area flat, separated by a transverse line of demarcation from the occipital, by which the median as well as lateral crests are limited; frontals wide in front, cavernous (like those of *Sciænid*s), and with longitudinal osseous bars leaving interspaces in front of transverse ridge and on each side near the front; prefrontals behind with simple foramina for olfactory nerves; supraorbital margins smooth.

Type *V. sordidus*, Poey.